

Frequently Asked Questions: Advantage Technology Embryo Armor™

Q. What does Advantage Technology Embryo Armor™ do?

A. Advantage Technology Embryo Armor™ is a prostaglandin inhibitor that is added to the collection medium at the time of embryo recovery that increases pregnancy rates following embryo transfer in recipient animals.

Q. Why should I use Advantage Technology Embryo Armor™?

A. During embryo collection, embryonic loss represents 75-80% of all reproductive losses between fertilization and calving¹; this reduced reproductive efficiency is obviously a major economic concern to the cattle industry. The majority of embryonic losses occur before day 8 of gestation², when the morula is developing into the blastocyst. One major cause of embryonic loss is environmental factors, including the release of Prostaglandin $F_{2\alpha}$, which typically affects the embryo between day 5-8 of development. Prostaglandin decreases the quality, and therefore the development of the embryo, by decreasing the ability of the embryo to hatch³. Advantage Technology Embryo Armor™ inhibits the ability of $PGF_{2\alpha}$ to bind to the embryo, thus facilitating successful embryo hatching and development.

Q. How was Advantage Technology Embryo Armor™ developed?

A. Historically, Banamine has been utilized to increase pregnancy rates in cattle⁴, and has even been used in humans for the same purpose⁵. However, Banamine functions to block the synthesis of $PGF_{2\alpha}$, and is not an actual inhibitor of the compound. The research developed at the University of Tennessee focused upon the development of a product that would specifically target prostaglandin receptors located on the developing embryo, which have been identified. Advantage Technology Embryo Armor™ actually binds to the receptor, and prevents $PGF_{2\alpha}$ from binding, decreasing the negative effects to the embryo.

Q. How do I use Advantage Technology Embryo Armor™?

A. Advantage Technology Embryo Armor™ is stored frozen and will need to be thawed prior to use, either at room temperature for approximately 30 minutes, or it may be quickly thawed in a water bath. The product, which is in a volume of 1 ml, should be removed plastic tube by inserting a 2-3 ml sterile syringe, then added to the 1 liter flush medium. For best results, we recommend drawing some volume from the collection medium back into the syringe and re-injecting into the bag to remove as much product as possible from the vial. The medium should be mixed well to ensure proper dilution of the product.

Q. What is the dosage of Advantage Technology Embryo Armor™?

A. Advantage Technology Embryo Armor™ is currently sold in a dosage optimized for 1 cow, in 1 liter of collection/flush medium. We have not tested the success of the product used in larger volumes of collection medium, or in the event one bag of collection medium is split between numerous animals. If a larger volume of collection medium will be used, we recommend using more than one vial of product. For example, use 2 doses of Advantage Technology Embryo Armor in a 2 liter collection medium bag.

Q. What kind of results can I anticipate if I use Advantage Technology Embryo Armor™?

A. Advantage Technology Embryo Armor™ has been tested in over 2000 cows in both experimental and field settings, and we are constantly adding animals to the data set. To date, the increase in the number of successful pregnancies is approximately 10% for fresh embryos and 10% for frozen embryos (P<0.01). The greatest overall pregnancy successes have been observed from facilities with good management systems, proper condition of recipient animals, and expert embryo transfer techniques and handling of embryos.

Q. Why is Advantage Technology Embryo Armor™ used in the collection media and not the holding media?

A. Studies have been conducted to compare the addition of Advantage Technology Embryo Armor™ to either the collection or holding media, or to both. Since the negative effects of PGF_{2α} are the greatest at the time of embryo collection, which is when the cow is being manipulated, protecting the embryo at this stage is critical. Addition of Advantage Technology Embryo Armor™ to the collection media is necessary to bind the prostaglandin receptor as soon as possible to minimize the amount of time the embryo is exposed to PGF_{2α}. No further increases in pregnancy rates were detected when the product was added to both types of media.

Q. Does Advantage Technology Embryo Armor™ cause any adverse effects?

A. In vitro studies conducted showed that Advantage Technology Embryo Armor™ itself has no negative or toxic effect on embryo development at a wide range of concentrations. Use of the product in vivo has not shown any adverse effects in the cow or calf, during calving or calf development.

Q. How do I store the Advantage Technology Embryo Armor™?

A. Currently, Advantage Technology Embryo Armor is stored frozen at -20°C and should be used within 30 days of manufacture. Shelf life studies are ongoing to determine how long the product remains stable and bioactive frozen. Expiration dates of the product will be updated based upon the results of the shelf life studies. When traveling, we recommend keeping the product frozen at all times until ready to use.

Q. Can Advantage Technology Embryo Armor™ be used for IVF?

A. We are currently optimizing the dosage for IVF use. In a research setting, the product did not elicit negative or toxic effects when used in vitro, and also exhibited positive results (i.e. protection of the embryo from PGF_{2α}). We anticipate a positive effect for IVF use.

¹ Sreenan and Diskin, 1983.

² Ayalon, 1978; Chenault, 1983; Wiebold, 1988.

³ Scenna et al., 2004.

⁴ Elli et al., 2001; McNaughtan et al., 2002; Pugh et al., 2004; Purcell et al., 2004; Scenna et al., 2005.

⁵ Rubenstein et al., 1999.